Measuring Salt Marsh Response to Sea Level Rise in the Hampton Seabrook Estuary

Our value of salt marshes has changed dramatically through the centuries. Once highly praised for support of fisheries and a source of fodder for cattle, marshes fell out of favor in the early 20th century and were filled for parking lots, wastewater treatment and landfills. More recently, we have recognized marshes have a suite of characteristics and functions that we value highly, ranging from support of fish and wildlife to erosion and flood control, nutrient cycling, and carbon storage. One extraordinary ecosystem service that is rarely recognized is the ability of marshes to maintain themselves - to build in elevation as sea level rises – without any help from us.

Sea level has been rising for the past 10,000 years in New England. Salt marshes developed along our shores about 4,500 years ago and those that are still around today have been building in elevation ever since. All you need to do is gaze across the marsh to realize the marsh's flat surface is a product of high tides depositing sediments evenly across it. As sediments are filtered from the floodwaters by marsh grasses, they produce new roots and rhizomes that bind it, gradually combining to form organic rich sediments, called peat. Every year the process continues, adding 1 to 3 mm to the marsh surface. With sea level expected to rise at rates exceeding 5 mm per year in the coming decades, we do not know whether marshes will be able to keep up. If they cannot, they will drown and we will lose the many benefits and services they provide.

Over the past two decades, scientists from many institutions, including UNH, have developed a tool called the Surface Elevation Table or SET, to measure the amount of sediment that builds up on the marshes. In Great Bay (NH) and the Webhannet River Estuary (Wells, ME), SET measurements show marshes have been building more rapidly over the past decade in response to increased rates of sea level rise.

In anticipation of a proposed planning grant, scientists at Jackson Estuarine Laboratory are establishing six SET stations in marshes within the Hampton Seabrook Estuary. The planning grant will provide information and options to towns faced with making choices on how they plan to adapt to sea level rise. The SET data will provide information to improve models used for wildlife habitat protection (Sea Level Affecting Marshes Model, or SLAMM) and help towns make decisions regarding adaptation options.

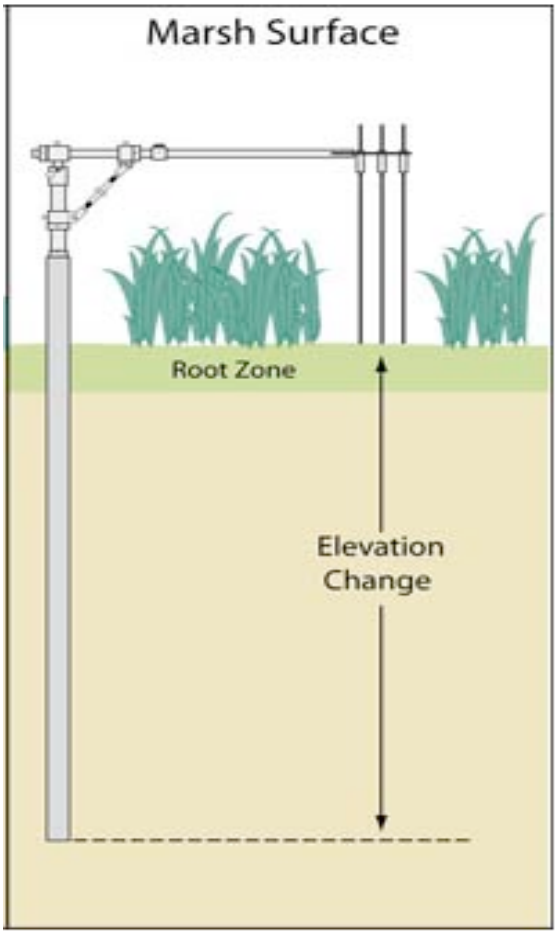

Image from Don Cahoon and Jim Lynch: http://www.pwrc.usgs.gov/set/

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Locations of benchmarks established for Surface Elevation Table (SET) measurements of sediment accretion and marsh elevation change in Hampton Seabrook Estuary.

SET installation is supported by the NH Coastal Program and the Thomas W. Haas Fund of the New Hampshire Charitable Foundation. The planning grant, led by the NH Coastal Program, combines efforts of several team members of the Climate Adaptation Workgroup (CAW).

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